

## WHAT IS CLAIMED IS:

1. An optical transmission line comprising a first negative dispersion fiber, a positive dispersion fiber, and a second negative dispersion fiber, said first negative dispersion fiber being spliced to one end of said positive  
5 dispersion fiber and the other end of said positive dispersion fiber being spliced to said second negative dispersion fiber,

wherein at one wavelength in the range of 1450 nm to 1600 nm, said first negative dispersion fiber has an absolute value of a dispersion slope of not larger than 0.03 ps/nm<sup>2</sup>/km and overall dispersion of not larger than -5 ps/nm;

10 the sum of the overall dispersion of said first negative dispersion fiber and the overall dispersion of said positive dispersion fiber is not smaller than 5 ps/nm at said one wavelength; and

the overall dispersion of said second negative dispersion fiber is not larger than -5 ps/nm at said one wavelength.

15 2. An optical transmission line according to Claim 1,  
wherein the difference in mode field diameter between said first negative dispersion fiber and said positive dispersion fiber and the difference in mode field diameter between said second negative dispersion fiber and said  
20 positive dispersion fiber are both equal to or less than 40% of the mode field diameter of said positive dispersion fiber at said one wavelength.

3. An optical transmission line according to Claim 1,

wherein the absolute value of the dispersion slope of said second negative dispersion fiber is not larger than  $0.03 \text{ ps/nm}^2/\text{km}$  at said one wavelength.

5           4. An optical transmission line according to Claim 1,

wherein said first negative dispersion fiber and said second negative dispersion fiber are substantially equal to each other in terms of their lengths, and also in terms of chromatic dispersions and dispersion slopes at said one wavelength.

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5. An optical transmission line according to Claim 1,

wherein at least one of said first negative dispersion fiber and said second negative dispersion fiber has a Raman gain coefficient of not larger than  $2.0/W/\text{km}$  at said one wavelength.

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6. An optical transmission line comprising a first negative dispersion fiber, an intermediate fiber, and a positive dispersion fiber, said first negative dispersion fiber being spliced to one end of said intermediate fiber, the other end of said intermediate fiber being spliced to said positive dispersion fiber,

20   wherein

said first negative dispersion fiber has an absolute value of a dispersion slope of not larger than  $0.03 \text{ ps/nm}^2/\text{km}$  and overall dispersion of not larger than  $-5 \text{ ps/nm}$  at one wavelength in the range of 1450 nm to 1600 nm;

said intermediate fiber has overall dispersion of substantially 0 ps/nm at said one wavelength; and

the sum of the overall dispersion of said first negative dispersion fiber and the overall dispersion of said positive dispersion fiber is not smaller than 0 ps/nm at said one wavelength.

7. An optical transmission line according to Claim 6,  
wherein said intermediate fiber is a dispersion shifted fiber.

10 8. An optical transmission line according to Claim 6,  
wherein said intermediate fiber is a dispersion managed fiber.

9. An optical transmission line comprising a first negative dispersion fiber and a positive dispersion fiber, said first negative dispersion fiber being  
15 spliced to said positive dispersion fiber,

wherein, said first negative dispersion fiber has an absolute value of a dispersion slope of not larger than 0.03 ps/nm<sup>2</sup>/km and overall dispersion of not larger than -5 ps/nm at one wavelength in the range of 1450 nm to 1600 nm;

20 the sum  $L$  of a length of said first negative dispersion fiber and a length of said positive dispersion fiber is not smaller than 10 km; and

the sum of the overall dispersion of said first negative dispersion fiber and the overall dispersion of said positive dispersion fiber is not smaller than 5

ps/nm but not larger than  $0.5 \text{ ps/nm/km} \times L$  at said one wavelength.

10. An optical transmission line according to Claim 9,

wherein said first negative dispersion fiber comprises a plurality of

5 negative dispersion fibers cascaded together in series,

of said plurality of negative dispersion fibers, one fiber connected to said positive dispersion fiber has a mode field diameter that allows said one fiber to be spliced to said positive dispersion fiber at a splice loss of not larger than 1.0 dB, and

10 of said plurality of negative dispersion fibers, another fiber located at an end opposite to said one fiber has a mode field diameter that allows said another fiber to be spliced to an output fiber of a transmitter at a splice loss of not larger than 1.0 dB.

15 11. An optical transmission line according to Claim 9,

wherein said positive dispersion fiber comprises a plurality of positive dispersion fibers cascaded together in series,

of said plurality of positive dispersion fibers, one fiber connected to said first negative dispersion fiber has a mode field diameter that allows said one  
20 fiber to be spliced to said first negative dispersion fiber at a splice loss of not larger than 1.0 dB, and

of said plurality of positive dispersion fibers, another fiber located at an end opposite to said one fiber has a mode field diameter that allows said

another fiber to be spliced to an input fiber of a receiver at a splice loss of not larger than 1.0 dB.

12. An optical transmission line according to any one of Claims 1, 6 and  
5 9,

wherein an effective core area of said first negative dispersion fiber is not smaller than  $30\ \mu\text{m}^2$  but not larger than  $60\ \mu\text{m}^2$  at said one wavelength.

13. An optical transmission line according to any one of Claims 1, 6, and  
10 9,

wherein the absolute value of the dispersion slope of said positive dispersion fiber is not larger than  $0.03\ \text{ps/nm}^2/\text{km}$  at said one wavelength.

14. An optical transmission line according to any one of Claims 1, 6 and  
15 9,

wherein the dispersion slope of said first negative dispersion fiber and the dispersion slope of said positive dispersion fiber are opposite in sign to each other at said one wavelength.

20 15. An optical transmission system comprising a transmitter for outputting signal light and an optical transmission line for transmitting the signal light outputted from said transmitter, said optical transmission line comprising a first optical fiber disposed in the most upstream part of said

optical transmission line and a second optical fiber spliced to said first optical fiber, wherein

said first optical fiber has negative chromatic dispersion and an absolute value of a dispersion slope of not larger than  $0.03 \text{ ps/nm}^2/\text{km}$  at any one

5 wavelength of the signal light, and

the absolute value of the sum of overall dispersion of said first optical fiber and overall dispersion of said second optical fiber is smaller than the absolute value of the overall dispersion of said first optical fiber at said one wavelength.

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16. An optical transmission system according to Claim 15,

wherein said optical transmission line further comprises a third optical fiber disposed in the most downstream part of said optical transmission line, and

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said third optical fiber has negative chromatic dispersion and an absolute value of a dispersion slope of not larger than  $0.03 \text{ ps/nm}^2/\text{km}$  at said one wavelength.

17. An optical transmission system according to Claim 15,

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wherein said first optical fiber has an effective core area of not larger than  $60 \text{ } \mu\text{m}^2$  and has a larger non-linear constant than said second optical fiber, and

the sum of overall dispersion of said first optical fiber and overall

dispersion of said second optical fiber is positive.

18. An optical transmission system according to Claim 15,

further comprising a light source for outputting pumping light for

5 Raman amplification to be supplied to said optical transmission line.